Two New Species and a New Record of *Protoptila* from Bolivia (Trichoptera: Glossosomatidae: Protoptilinae)

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ABSTRACT The caddisfly genus *Protoptila* (Trichoptera: Glossosomatidae: Protoptilinae) has never before been recorded from Bolivia. *Protoptila dubitans* Mosely 1939 is now reported from Bolivia for the first time. Additionally, two new species from Bolivia, *P. diablita* and *P. julieta* are described. *Protoptila julieta* is most closely related to *P. misionensis* Flint 1972. *Protoptila diablita* is the first known species in the genus to possess scale-like setae. These scales are hypothesized to aid in the dispersal of male sex pheromones.

KEY WORDS caddisfly, Neotropics, male genitalia, scales, androconial system

The caddisfly genus *Protoptila* Banks 1904 is the largest member of the subfamily Protoptilinae and currently contains 91 described species. The genus is widespread throughout the Americas, but it reaches its greatest diversity in the Neotropics where >77 species occur. Adults are often present in large numbers at blacklights, but they have been neglected by collectors, perhaps because of their small size (<5 mm). In recent years, many new species have been described from Mexico, Panama, and Costa Rica (Bueno-Soria et al. 2004, Holzenthal and Blahnik 2006). Although *Protoptila* is now known from virtually every country in Latin America, it has never been recorded from Bolivia (Flint et al. 1999). This is not necessarily representative of the true Bolivian caddisfly diversity, but rather it is a reflection of how poorly the country has been collected.

In this article, we describe two new *Protoptila* species, *P. diablita* and *P. julieta. P. diablita* possesses conspicuous setae modified into scales, the first recorded incidence for the genus. We present a brief overview of the occurrence of scales in Trichoptera and their possible functional significance and phylogenetic usefulness in Protoptilinae. Additionally, we report a new record for *P. dubitans* Mosely 1939.

Materials and Methods

Specimens were collected during two expeditions to Bolivia in July 2003 and November 2004. Adults were collected primarily at night near the edge of streams and rivers using a UV light and a bed sheet. The insects were collected directly from the sheet into KCN kill jars and mounted on minutens the following day. Other adjunct collecting methods included the use of UV pan-traps and a Malaise trap. Additional material was borrowed from the National Museum of Natural History, Smithsonian Institution. Specimen preparation and examination followed the procedures outlined in detail by Blahnik and Holzenthal (2004) and Holzenthal and Andersen (2004). Pencil sketches of specimens were made using a drawing tube and Olympus BX41 compound microscope and digitally inked using Adobe Illustrator CS3 (Adobe Systems, Mountain View, CA). A single pinned specimen was sputter-coated with gold and examined using a Hitachi S3500N variable pressure scanning electron microscope. Morphological terminology for male genitalia follows that of Holzenthal and Blahnik (2006). Each individual specimen or lot of alcohol specimens examined received a barcode label with a unique nine-digit alphanumeric code starting with the prefix UMSP. This prefix indicates that the specimen has been databased at the University of Minnesota Insect Collection (UMSP), and it is not meant to imply possession by UMSP. In this article, barcode numbers are reported only for holotypes; however, all specimens examined, including paratypes, have been databased. Specimen-level taxonomic, locality, and other information, including all individual barcode numbers, are stored in the software program Biota, The Biodiversity Database Manager (Colwell 2007), and they can be accessed at http://www.entomology.umn.edu/museum/databases/BIOTAdatabase.html. Types and other material examined are deposited in the University of Minnesota Insect Collection, St. Paul, MN, USA (UMSP); the National Museum of Natural History, Smithsonian Institution, Washington, DC, USA (NMNH); and the Museo de Historia Natural Noel Kempff Mercado, Santa Cruz de la Sierra, Bolivia (UASC).

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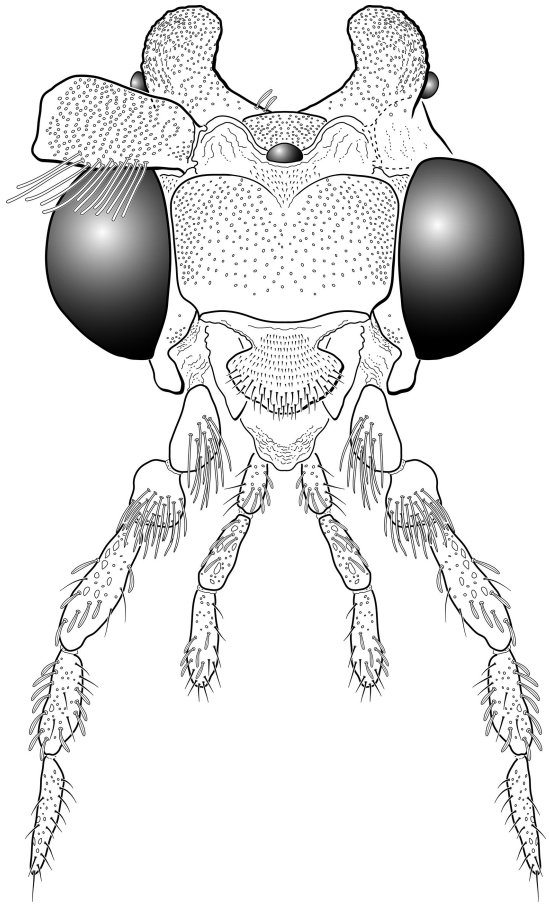

Fig. 1. *Protoptila diablita*, new species. Frontal view of adult male head (left antennal scape removed).

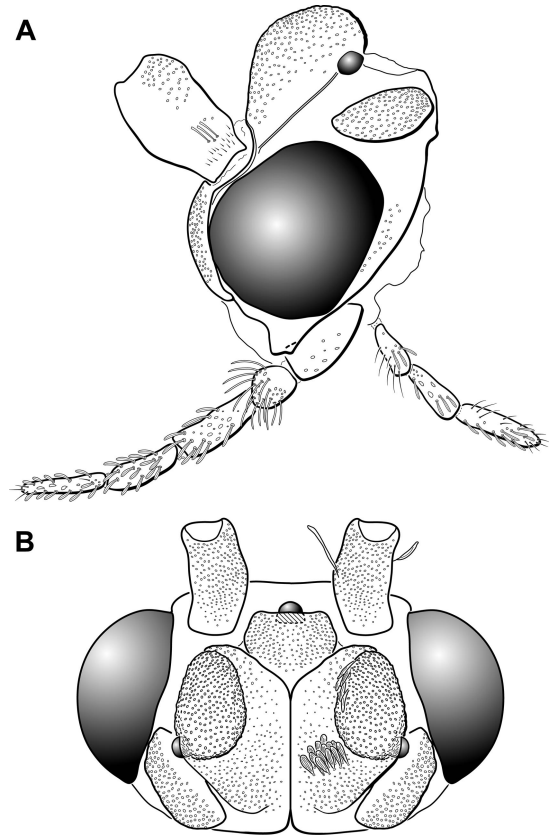

Fig. 2. *Protoptila diablita*, new species. Adult male head. (A) Lateral view. (B) Dorsal view.

Protoptila diablita, new species
(Figs. 1–4)

Type Material. HOLOTYPE: male (pinned). BOLIVIA: La Paz: ANMI [Área Natural de Manejo Integrado] Madidi, Raya Mayo river at Wabacuro trail, Chalalan Ecolodge, 14° 26′ 33″ S, 067° 54′ 39″ W, 351 m, 28-VII-2003, Robertson and Blahnik (UMSP0000 86363) (UASC).

PARATYPES: BOLIVIA: La Paz: Abel Itturalde, Hacienda Chiquitos, Arroyo Chiquitos, San Buenaventura-Ixiamas road, km 23, 14° 20′ 05″ S, 067° 42′ 12″ W, 284 m, 23-VII-2003, Robertson and Blahnik—one male (gold-coated for scanning electron microscopy [SEM]) (UMSP); Abel Itturalde, Arroyo Maije at Puente Maije bridge on San Buenaventura-Ixiamas road, 14° 20′ 54″ S, 067° 40′ 32″ W, 278 m, 14-VII-2003, Robertson and Blahnik—one male (pinned) (UMSP); ANMI Madidi, Raya Mayo river at Anta trail, Chalalan Ecolodge, 14° 26′ 08″ S, 067° 55′ 46″ W, 264 m, 26-VII-2003, Robertson and Blahnik—one male (pinned) (UMSP); ANMI Madidi, Arroyo Bacuatra Grande, Comunidad San Miguel de la Bala, 14° 30′ 44″ S, 067° 31′ 23″ W, 280, 17–19-VII-2003, Robertson, Blahnik, Apaza—one male (pinned) (UASC); Santa Cruz: PN & ANMI [Parque Nacional & Área Natural de Manejo Integrado] Amboró, Guarda Parque Mataracú, Confluence of Quebrada Verde Uno y Dos, 17° 33′ 11″ S, 063° 52′ 09″ W, 371 m, 23-XI-2004, Robertson, Garcia, Vidaurre—two males (in alcohol) (UMSP); PN & ANMI Amboró, Guarda Parque Mataracú, Q. Verde Uno, 17° 33′ 14″ S, 063° 52′ 09″ W, 374 m, 19–23-XI-2004, Robertson, Garcia, Vidaurre—two males (UMSP), one male (UASC), one male (NMNH) (in alcohol).

Diagnosis. This new species is easily recognized by the distinct, greatly enlarged anterior setal warts on the dorsum of the head and the conspicuous yellowish brown scales on the head, thorax, and basal half of the wings. In the male genitalia, it is most similar to *P. bribri* Holzenthal & Blahnik 2006 (Costa Rica), *P. colombiensis* Flint 1974 (Colombia), *P. ixtala* Mosely 1937 (Mexico, Honduras, Guatemala, and Costa Rica), and *P. orotina* Flint 1974 (Costa Rica, Panama, and Colombia), which have similarly shaped parameres, rather simple-shaped basal and apical sections of tergum X, and an elongate sternum VIII. *P. diablita* differs from these species by the shape of the phallicata, which is much less angularly bent. The paramere spine of *P. diablita* is also much smaller than in those species. *P. diablita* also displays some similarity to *P. piacha* Mosely 1954 (Mexico) but in *P. diablita*, tergum X is more truncate, the apex of the phallus has diverging

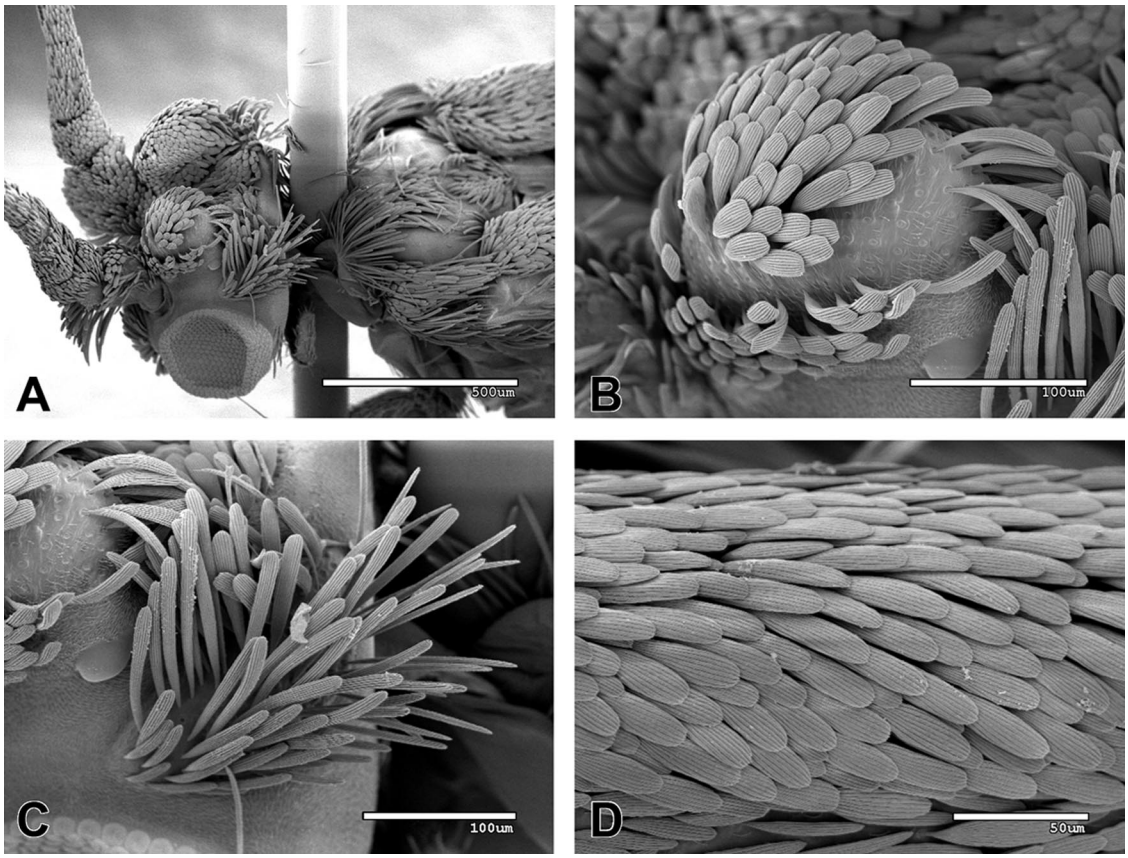

Fig. 3. *Protoptila diablita*, new species. (A) Dorsolateral overview of scales on antennae, head, thorax, and base of wings. (B) Dorsolateral view of enlarged anterior setal wart on head. (C) Dorsolateral view of posterolateral setal warts on head. (D) Dorsolateral view of basal portion of forewing showing scale pattern.

apicodorsal sclerotized ridges, and the paramere spine is much shorter.

Description (Adult Male Only; Female Unknown). Length of forewing: 3.5–4.0 mm (n = 11). Forewing densely covered with yellowish brown scales along basal half of posterior margin (Fig. 3D), apical half with light brown setae, with transverse bar of whitish setae along cord, and several small patches of whitish spots along apical margin. Hind wing with yellowish brown scales along basal two-thirds of posterior margin. Foreleg coxae yellowish, tibiae and tarsi covered with yellowish brown scales. Middle and hind legs yellowish with dark brown setae. Head (Figs. 1, 2, and 3A–C) broader than long, vertex densely covered with yellowish brown scales, with large frontal wart (Figs. 1 and 2A) covered with elongate scales, large anteromesal setal wart (Figs. 1 and 2B) with short scales, pair of extremely enlarged, stalk-like anterior setal warts (Figs. 1, 2, and 3A and B) (indistinguishable from posterior warts) with short scales, and large subquadrate posterolateral setal warts (Figs. 2 and 3A and C) with elongate scales. Ocelli present. Antennal scape (Figs. 1, 2, and 3A) with elongate scales anteriorly, shorter scales posteriorly, pedicel and flagellum densely covered with short scales. Maxillary palpi (Figs. 1 and 2A) five segmented, first and second segments with elongate scales apically; second segment bulbous; last three segments with shorter scales interspersed with setae, and enlarged, irregularly shaped pores. Labial palpi (Figs. 1 and 2A) with shorter scales interspersed with setae, with enlarged, irregularly shaped pores on second segment. Prothorax with two large pronotal warts, covered in elongate scales. Mesothorax (Fig. 3A) with large tegula with elongate scales. Mesoscutum with pair of large, subtriangular anteromesal setal warts covered with short scales, and small suboval posterolateral pair with elongate scales; mesoscutellum with short scales. Forewings narrow, margins nearly parallel, apex oblique, with row of erect setae approximately halfway between Cu2 and A1. Forewing venation incomplete, apical forks I, II, and III present. Hind wings narrow, abruptly narrowed past anastomosis, subacute apically, apical fork II present.

Male genitalia (Fig. 4). Sternum VI process relatively short, slightly curved, subtriangular, apically subacute. Tergum VIII (Fig. 4A) posterior margin with row of elongate setae; sternum VIII (Figs. 4A and B) strongly produced ventrally, narrowed, weakly emarginate but not bifurcate apically. Segment IX

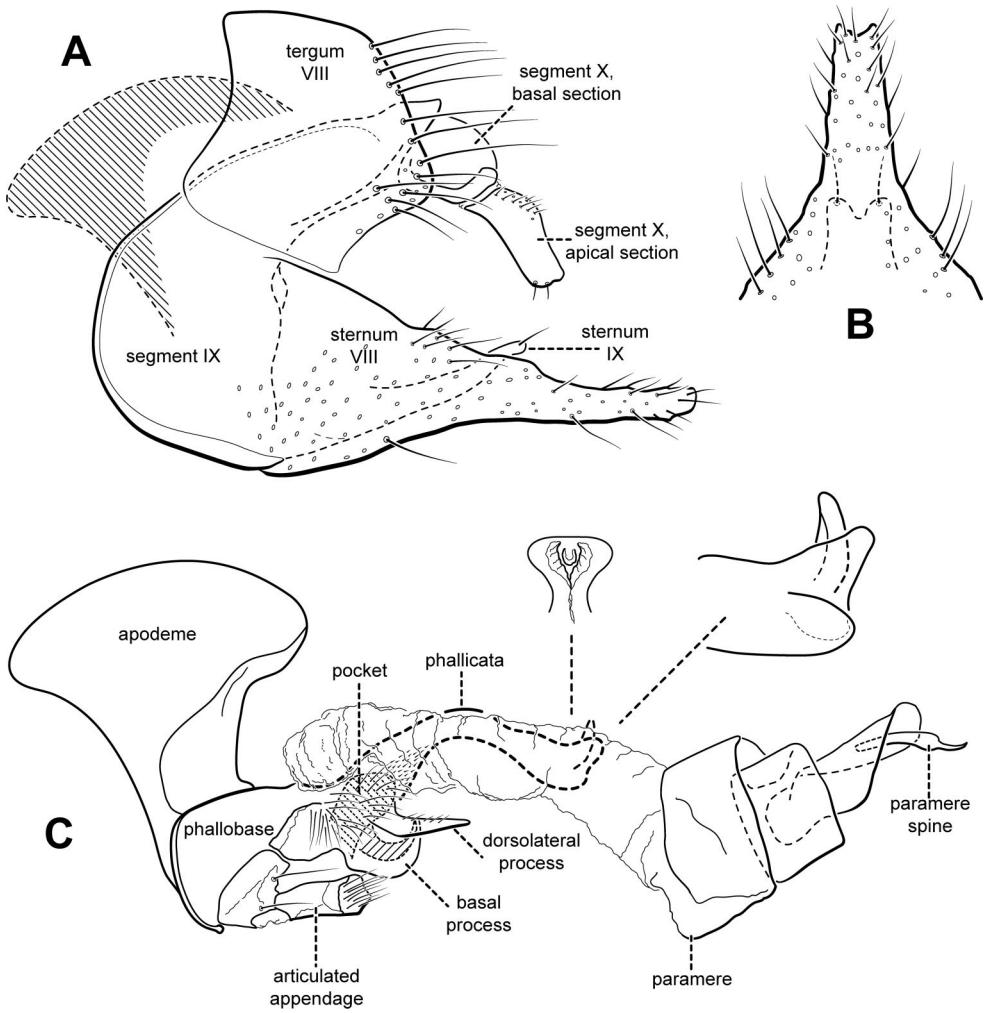

Fig. 4. *Protoptila diablita*, new species. Male genitalia. (A) Lateral view of genital capsule, phallic apparatus removed. (B) Ventral view of sterna VIII and IX. (C) Lateral view of phallic apparatus. Left inset is ventral view of apex of phallus; right inset is enlarged lateral view of apex of phallus.

(Fig. 4A) with anterolateral margins broadly rounded; sternum IX (Figs. 4A and B) medially produced posteriorly, partially fused to lateral margins of VIII, long, narrow, slightly emarginate apically, with pair of apical setae; posterolateral margins of segment IX without processes. Preanal appendages absent. Tergum X (Fig. 4A) divided mesally to form sclerotized lateral parts with basal and apical sections; basal section subquadrate, about as long as wide, apical section longer than basal section, nearly uniform in width, slightly angularly bent from base, apex truncate. Phallobase (Fig. 4C) dorsally with large, semicircular, laterally compressed apodeme; ventrally with pair of short, rodlike, articulated appendages with apical setae, appendages fitting into sclerotized pockets on ventral margin of phallobase; posteroventral margin of phallobase with short, paired, upturned, apically acute basal processes and also dorsolateral processes; dorsolateral processes very short, straight, acute; parameres elongate, membranous basally, becoming slightly sclerotized apically in concertina-shaped coil, paramere spines short, acute apically; phallicata elongate, narrow, arched near middle, apex enlarged, with diverging apicodorsal sclerotized ridges; endophallus reduced, not noticeably everted; phallotremal sclerite lightly sclerotized, indistinct.

Distribution. Presently known only from La Paz and Santa Cruz departments of Bolivia. This species was collected near small to medium-sized, clear streams in tropical lowland rain forest at altitudes ranging from 264 to 371 m.

Etymology. *Diablita* is the Spanish word for "little devil," and refers to the prominent horn-like anterior setal warts on the dorsum of the head.

Discussion. Trichoptera are the well established monophyletic sister order to Lepidoptera, together comprising the clade Amphiesmenoptera, literally "garment wings," referring to the clothing of scales

or hairs on the wings (Kristensen 1984, Grimaldi and Engel 2005). As the order's name implies, Trichoptera are known to possess generally the more primitive character state, having hairs, rather than scales. Despite this, the presence of scales has arisen independently several times in various Trichoptera lineages. Perhaps the earliest account of scales in Trichoptera was in the aptly named limnephilid *Monocentra lepidoptera* Rambur (1842). Betten (1934) later described "clublike and flatter striate scales" found along the "groove or furrow extending longitudinally through the wings" of certain Hydroptilidae, Sericostomatidae, Molannidae, Rhyacophilidae, and Leptoceridae. More recently, wing scales have been reported also in the families Conoesucidae, Goeridae, Helicopsychidae, Lepidostomatidae, and Limnephilidae (Moretti and Bicchierai 1979, Moretti et al. 1979, Moretti and Bicchierai 1981, Denning 1982, Botosaneanu and Flint 1991, Ward and McKenzie 1998). Scales also have been found on the antennae, maxillary palpi, head vertex, legs, and abdomens of certain Trichoptera (Mosely 1923, Wells 1984, Weaver 1988, Botosaneanu 1991, Botosaneanu and Flint 1991, Holzenthal and Strand 1992). Although superficially similar, the scales of Lepidoptera and Trichoptera are not homologous: the longitudinal ridges of caddisfly scales lack flutes, the presence of which is considered to be an apomorphy for Lepidoptera (Huxley and Barnard 1988).

Several functions of caddisfly scales have been hypothesized. In Leptoceridae, scales occur on both males and females and are thought to be involved in intraspecific communication or protection from predators (Huxley and Barnard 1988). In most other families, scales occur almost exclusively on males, and they are generally considered to function in mating activities, likely due to the nonreproductive activities are limited in most adult caddisflies (Wells 1984, Solem and Solem 1991). Females are known to produce sex pheromones, and several studies have demonstrated their ability to attract males from long distances (Kelner-Pillault 1975, Resh and Wood 1985, Solem 1985, Solem and Solem 1991; Houghton 2002). Scale-like setae on male caddisflies may act as sensilla for detecting these pheromones. Wells (1984) found that in hydroptilids, flatter sensilla with corrugated surfaces, which she termed sensilla auricillica, were more abundant and diverse in males. These sensilla stained positively with crystal violet, a standard test for detecting chemosensilla; therefore, they probably serve an olfactory function as opposed to mechanoreception.

Scales in Trichoptera also have been linked to the production and dispersal of male sex pheromones in the form of androconial organs. Androconial organs are modified scales in the wings, antennae, and abdomen associated with glandular cells that produce aphrodisiac pheromones (Boppré 1984). Scales provide a large surface area for the evaporation of pheromones or may protect underlying glandular organs (Boppré 1984). Some Trichoptera have developed complex "double" androconial systems, with pairs of organs occurring on different parts of the body (Botosaneanu 1991, Botosaneanu and Flint 1991). These scent-distributing organs may be separate from scent-secreting tissues (Boppré 1984).

Because adult protoptiline behavior has not been well studied, one can only speculate on the function of the scales occurring in *P. diablita.* Although we collected numerous protoptiline females, we were unable to associate definitively any specimens to this new species, because two other *Protoptila* species were present at the same localities. However, of the hundreds of female *Protoptila* collected, not a single specimen possessed any sign of scales, indicating that they are probably sexually dimorphic in this character. Scales might serve as a visual cue to females for mate recognition, the enlarged anterior setal warts on the dorsum of the head making them even more conspicuous. The scales may even have reflective properties or increased visibility in the UV range; many groups of insects are known to be visually sensitive to UV wavelengths (Chapman 1998). It is also very likely that these setae function as androconial organs. Without examination using transmission electron microscopy, it is difficult to positively identify underlying glandular tissue; however, we did observe enlarged pores on the maxillary and labial palpi. These pores may be involved in active secretion or diffusion of pheromone and the scales present on the anterior half of the insect may aid in its dispersal.

To the best of our knowledge, scales have never before been reported in *Protoptila.* However, in the closely related protoptiline genus *Mexitrichia,* scales are known to occur on the forewing and hind wing of *M. atenuata* Flint 1963, *M. leei* Flint 1974, and *M. velasquezi* Flint 1991. Based on male genitalic morphology, *M. atenuata* and *M. leei* seem to be closely related (Flint 1974), and the presence of scales in both species may provide additional character support for this relationship. Flint (1991) suggested that *M. velasquezi* might be related to *M. leei* based on presence of scales, although the male genitalia of these species are not very similar. Apart from lending support to the relationships of these *Mexitrichia* species, the phylogenetic value of scales in Protoptilinae is rather limited, because their occurrence is rare and scattered. We observed the scales of *M. velasquezi* with SEM, and we found their morphology to be quite different from that of *P. diablita.* In the type species of the genus *Nepaloptila,* described from Nepal, Kimmins (1964) noted that the dorsal surface of the pronotum was "densely covered with erect, blackish, scale-like hairs," but he did not mention the presence of any wing scales. However, Malicky and Chantaramongkol (1992) reported the occurrence of scales on the wings, but not the pronotum, of three additional known *Nepaloptila* species from Thailand. Similarly, Malicky and Chantaramongkol (1992) observed wing scales in three species of *Padunia* Martynov from Thailand, yet the presence of these scales has not been re-

ported on the remaining *Padunia* species from Japan, Korea, and Russia, including the type species (Martynov 1910, 1929, 1934; Kagaya and Nozaki 1998). The genera *Nepaloptila* and *Padunia* are primitive members of the subfamily and thus not closely related to either *Protoptila* or *Mexitrichia* (Kimmins 1964, Robertson and Holzenthal 2005). Although scales may offer support for the monophyly of some genera or groups of species, their presence in the Protoptilinae seems to be convergent. Even within *Padunia* they do not occur on all species and in *Nepaloptila* they occur on the pronotum of the type species, but on the wings of other species. In her detailed study of antennal structures in Hydroptilidae, Wells (1984) similarly concluded that scales are homoplastic, and probably arose independently on a number of occasions.

Protoptila dubitans Mosely 1939

Protoptila dubitans Mosely 1939: 221 [type locality: Brazil, Santa Catarina, Nova Teutonia; BMNH; male].—Mangeaud, 1996: 154 [distribution].

This species was originally described from Santa Catarina province of Brazil and adequately illustrated by Mosely (1939, figs. 139–142). Additional records were reported from the Gran Chaco region of Argentina (Mangeuad 1996). We collected specimens from La Paz and Santa Cruz departments of Bolivia at elevations from 284 to 371 m.

Material Examined. BOLIVIA: La Paz: Abel Itturalde: Hacienda Chiquitos, Arroyo Chiquitos, San Buenaventura-Ixiamas road, km 23, 14° 20′05″S, 067° 42′12″ W, 284 m, 23-VII-2003, Robertson and Blahnik—one male (pinned) (UMSP); Arroyo Maije at Puente Maije bridge on San Buenaventura-Ixiamas road, 14° 20′54″S, 067° 40′32″ W, 278 m, 14-VII-2003, Robertson and Blahnik—two males (UMSP), one male (UASC) (pinned); Santa Cruz: PN & ANMI Amboró, Guarda Parque Mataracú, Confluence of Quebrada Verde Uno y Dos, 17° 33′ 11″ S, 063° 52′ 09″ W, 371 m, 23-XI-2004, Robertson, Garcia, Vidaurre—one male (UMSP) (in alcohol).

Protoptila julieta, new species
(Fig. 5)

Type Material. HOLOTYPE: male (pinned). BOLIVIA: Cochabamba: Paracticito, R. San Rafaél, Pte. "Panchito," nr. P.N. Carrasco station, 17° 03′39″S, 065° 28′58″W, 438 m, 9–10-XI-2004, Robertson, Garcia, Vidaurre (UMSP000086371) (UASC).

PARATYPES: ARGENTINA: Salta: Río Pescado, W. Orán, 14-X-1973, Flint, O.S., Jr.—one male (NMNH) (pinned); Tucumán: Río Tipas, San Pedro de Colacao, 1,067 m, 16-I-1969, W.L. & J.G. Peters—one male (NMNH) (in alcohol); BOLIVIA: Cochabamba: Paracticito, R. San Rafaél, Pte. "Panchito," nr. P.N. Carrasco station, 17° 03′39″S, 065° 28′58″ W, 438 m, 9–10-XI-2004, Robertson, Garcia, Vidaurre—seven males (UMSP) (pinned), one male (in alcohol) (UMSP); Santa Cruz: PN & ANMI Amboró, Guarda Parque Mataracú, Q. Verde Uno, 17° 33′14″ S, 063° 52′09″ W, 374 m, 19–23-XI-2004, Robertson, Garcia, Vidaurre—four males (UASC) (in alcohol); PERU: Huanuco: Tingo Maria, 672 m, 1–6-II-1980, Heppner, J.B.—18 males (NMNH) (in alcohol).

Diagnosis. This species is closely related to *P. misionensis* Flint 1972 described from Argentina. It differs by the shape of sternum VIII, which is more elongate and curved in this new species (Fig. 5A) than in *P. misionensis* (Fig. 5F). Also, in the new species the pair of broad, downturned processes from the apicoventral margin of the phallicata are very prominent, heavily sclerotized, and subtriangular (Fig. 5C), whereas in *P. misionensis* (Fig. 5E) these processes are round, less sclerotized, and with a small apical tooth. Finally, the new species can be distinguished from *P. misionensis* (Fig. 5D) based on the shape of the apical section of segment X (Fig. 5A). *P. julieta* has shorter and less sharply bent processes basolaterally, a less pronounced pair of ventrolateral spine-like processes, and a truncate apex.

Description (Adult Male Only; Female Unknown). Length of forewing: 3.6–4.0 mm ($n = 33$). Forewing color dark brown, with indistinct transverse bar of whitish setae along cord and a few whitish apical spots. Body and appendages yellowish brown with dark brown hairs interspersed with lighter yellowish hairs. Forewings narrow, margins nearly parallel, apex oblique, with row of erect setae approximately halfway between Cu2 and A1. Forewing venation incomplete, apical forks I, II, and III present. Hind wings narrow, abruptly narrowed past anastomosis, subacute apically, apical fork II present.

Male genitalia (Fig. 5). Sternum VI process relatively short, slightly curved, subtriangular, apically acute. Tergum VIII (Fig. 5A) with row of elongate setae with attenuate, curved apices posteriorly, posterior margin membranous; sternum VIII (Figs. 5A and B) strongly produced ventrally, distinctly bifurcate apically, branches acute apically, broad basally, moderately elongate. Segment IX (Fig. 5A) with anterolateral margin broadly rounded; sternum IX slightly produced posteriorly, broad in ventral view, slightly emarginate apically; posterolateral margins of segment IX with long, narrow processes, strongly bowed upward and outward from base in lateral view, converging apically, apices attenuate. Preanal appendages absent. Tergum X (Fig. 5A) divided mesally to form sclerotized lateral parts with basal and apical sections; basal section subquadrate, about as long as wide, apical section longer than basal section, with pair of elongate, basolateral processes extending laterad basally then strongly angularly bent dorsad and curving ventrally; ventrolaterally with pair of strong spine-like processes directed inward, apex truncate. Phallobase (Fig. 5C) dorsally with large, semicircular, laterally compressed apodeme; ventrally with pair of short, rodlike, articulated appendages with apical setae, appendages fitting into sclerotized pockets on ventral margin of phallobase; posteroventral margin of phallobase with short, paired, upturned, apically acute basal processes

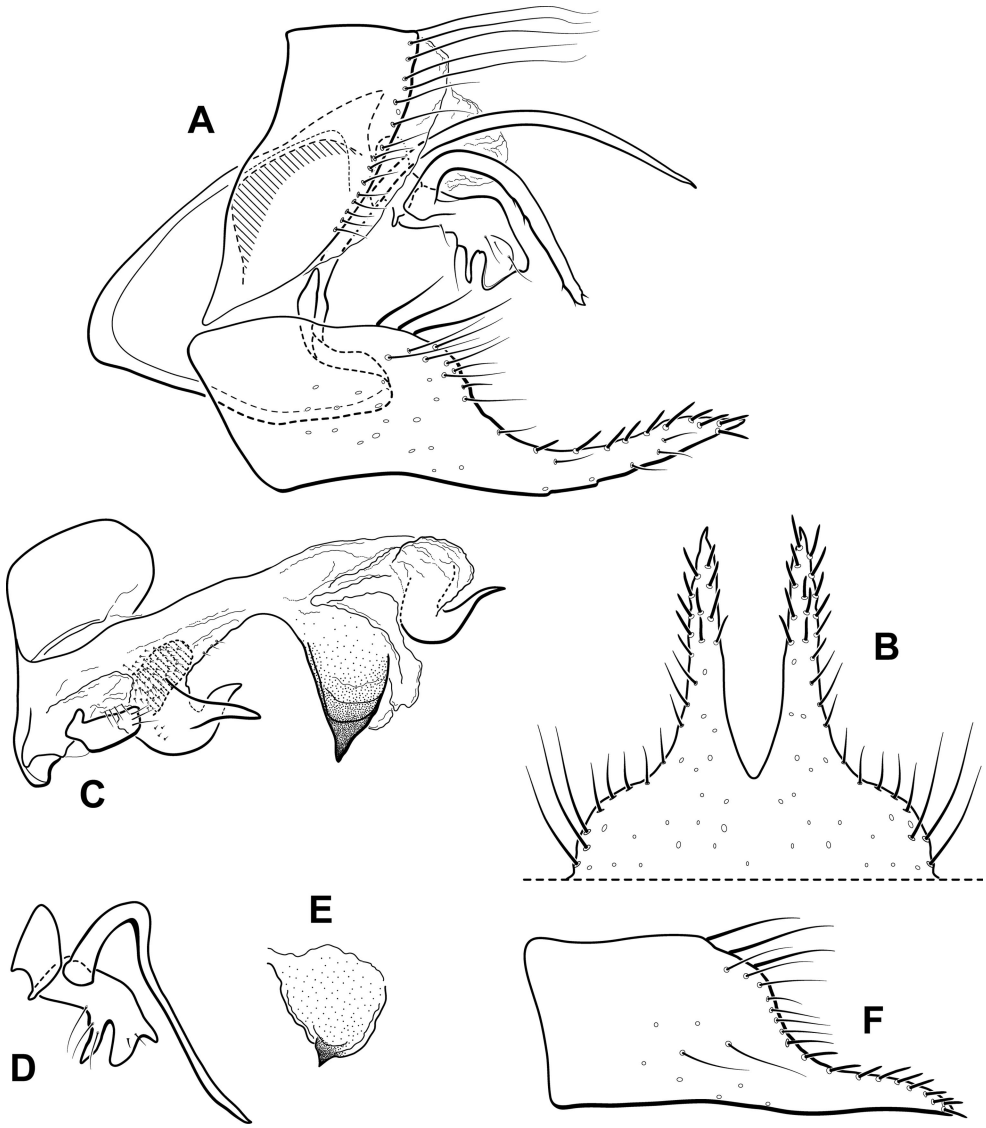

Fig. 5. Male genitalia. (A–C) *Protoptila julieta*, new species. (A) Lateral view of genital capsule, phallic apparatus removed. (B) Ventral view of sternum VIII. (C) Lateral view of phallic apparatus. (D–F) *P. misionensis* Flint 1972. (D) Lateral view of tergum X. (E) Lateral view of apicoventral process of phallicata. (F) Lateral view of sternum VIII.

and also dorsolateral processes; dorsolateral processes very short, straight, acute; paramere absent; phallicata short, wide basally in lateral view, with prominent pair of broad, downturned subtriangular processes from the apicoventral margin; endophallus membranous, enlarged when everted; phallotremal sclerite spine-like, sinuous, sclerotized apically, somewhat divided basally.

Distribution. Presently known from Cochabamba and Santa Cruz departments of Bolivia, Tucumán and Salta provinces of Argentina, and Huanuco province of Peru. These areas correspond to the Amazonian and Yungas biogeographical regions of Cabrera and Willink (1980).

Etymology. We are pleased to name this species for Julieta Ledezma, Head of Entomology, Museo de Historia Natural Noel Kempff Mercado, Santa Cruz, Bolivia.

Discussion. Dr. Oliver Flint, Jr., Smithsonian Institution, kindly loaned us multiple specimens of *P. misionensis* collected from areas near the type locality in Misiones province, Argentina (Arroyo Coati, 15 km east of San Jose; Arroyo Saura, 9 km north of Leandro N. Alem) as well as material from Brazil (Sao Paulo, Piracicaba; Paraná, Foz do Iguacu National Park) and Paraguay (Rio Aquidaban, Cerro Cora) to compare with our new species. Although *P. misionensis* and *P. julieta* are quite similar, the differences in genitalic

morphology, as compared in the diagnosis, remain constant and distinct among different localities and there is no overlap between the two species. *Protoptila julieta* occurs in the Amazonian and Yungas regions, whereas *P. misionensis* is known from the Paranensis biogeographical region of Cabrera and Willink (1980).

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